



Differentiate quotients using the quotient rule

1

Find the derivative $f'(x)$ using the power rule.

$$\text{if } f(x) = x^n, f'(x) = n x^{n-1}$$

$$[12pt] f(x) = x^{\frac{3}{2}}$$

A $f'(x) = \frac{3}{2} x^{\frac{5}{2}}$

B $f'(x) = \frac{3}{2} x^{\frac{1}{2}}$

C $f'(x) = \frac{3}{2} x^{\frac{3}{2}}$

D $f'(x) = x^{\frac{1}{2}}$

3

Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{4x^4 + 5}{3x + 5}$$

A $f'(x) = \frac{(16x^3)(3x + 5) - (4x^4 + 5)(3)}{(3x + 5)}$

B $f'(x) = \frac{(16x^3)(3x + 5) + (4x^4 + 5)(3)}{(3x + 5)^2}$

C $f'(x) = \frac{(4x^4 + 5)(3) - (16x^3)(3x + 5)}{(3x + 5)^2}$

D $f'(x) = \frac{(16x^3)(3x + 5) - (4x^4 + 5)(3)}{(3x + 5)^2}$

2

Find the derivative $f'(x)$ using the power rule.

$$\text{if } f(x) = a x^n, f'(x) = a n x^{n-1}$$

$$[12pt] f(x) = \frac{7}{x^2}$$

A $f'(x) = -14x^{-3}$

B $f'(x) = -14x^{-2}$

C $f'(x) = -14x^{-1}$

D $f'(x) = 7x^{-3}$

4

Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{-4x^{-2} + 2}{-2x^2 - 7}$$

A $f'(x) = \frac{(8x^{-3})(-2x^2 - 7) + (-4x^{-2} + 2)(-4x)}{(-2x^2 - 7)^2}$

B $f'(x) = \frac{(-4x^{-2} + 2)(-4x) - (8x^{-3})(-2x^2 - 7)}{(-2x^2 - 7)^2}$

C $f'(x) = \frac{(8x^{-3})(-2x^2 - 7) - (-4x^{-2} + 2)(-4x)}{(-2x^2 - 7)}$

D $f'(x) = \frac{(8x^{-3})(-2x^2 - 7) - (-4x^{-2} + 2)(-4x)}{(-2x^2 - 7)^2}$



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Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{-\frac{4}{x^2} - 3}{2x - 2}$$

$$A \quad f'(x) = \frac{(-4x^{-2} - 3)(2) - (8x^{-3})(2x - 2)}{(2x - 2)^2}$$

$$B \quad f'(x) = \frac{(8x^{-3})(2x - 2) + (-4x^{-2} - 3)(2)}{(2x - 2)^2}$$

$$C \quad f'(x) = \frac{(8x^{-3})(2x - 2) - (-4x^{-2} - 3)(2)}{(2x - 2)}$$

$$D \quad f'(x) = \frac{(8x^{-3})(2x - 2) - (-4x^{-2} - 3)(2)}{(2x - 2)^2}$$

6

Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{5x^{\frac{4}{3}} - 4}{-4x}$$

$$A \quad f'(x) = \frac{(5x^{\frac{4}{3}} - 4)(-4) - (\frac{20}{3}x^{\frac{1}{3}})(-4x)}{(-4x)^2}$$

$$B \quad f'(x) = \frac{(\frac{20}{3}x^{\frac{1}{3}})(-4x) - (5x^{\frac{4}{3}} - 4)(-4)}{(-4x)}$$

$$C \quad f'(x) = \frac{(\frac{20}{3}x^{\frac{1}{3}})(-4x) + (5x^{\frac{4}{3}} - 4)(-4)}{(-4x)^2}$$

$$D \quad f'(x) = \frac{(\frac{20}{3}x^{\frac{1}{3}})(-4x) - (5x^{\frac{4}{3}} - 4)(-4)}{(-4x)^2}$$

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Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{2\sqrt[3]{x^2} + 5}{-3x + 5}$$

$$A \quad f'(x) = \frac{(\frac{4}{3}x^{-\frac{1}{3}})(-3x + 5) - (2x^{\frac{2}{3}} + 5)(-3)}{(-3x + 5)^2}$$

$$B \quad f'(x) = \frac{(\frac{4}{3}x^{-\frac{1}{3}})(-3x + 5) - (2x^{\frac{2}{3}} + 5)(-3)}{(-3x + 5)}$$

$$C \quad f'(x) = \frac{(2x^{\frac{2}{3}} + 5)(-3) - (\frac{4}{3}x^{-\frac{1}{3}})(-3x + 5)}{(-3x + 5)^2}$$

$$D \quad f'(x) = \frac{(\frac{4}{3}x^{-\frac{1}{3}})(-3x + 5) + (2x^{\frac{2}{3}} + 5)(-3)}{(-3x + 5)^2}$$

8

Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{-3x^{-\frac{4}{3}} + 5}{2x}$$

$$A \quad f'(x) = \frac{(4x^{-\frac{7}{3}})(2x) + (-3x^{-\frac{4}{3}} + 5)(2)}{(2x)^2}$$

$$B \quad f'(x) = \frac{(4x^{-\frac{7}{3}})(2x) - (-3x^{-\frac{4}{3}} + 5)(2)}{(2x)}$$

$$C \quad f'(x) = \frac{(4x^{-\frac{7}{3}})(2x) - (-3x^{-\frac{4}{3}} + 5)(2)}{(2x)^2}$$

$$D \quad f'(x) = \frac{(-3x^{-\frac{4}{3}} + 5)(2) - (4x^{-\frac{7}{3}})(2x)}{(2x)^2}$$



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Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{\frac{3}{\sqrt[3]{x^2}} - 3}{-3x^2 - 2}$$

A
$$f'(x) = \frac{(-2x^{-\frac{5}{3}})(-3x^2 - 2) - (3x^{-\frac{2}{3}} - 3)(-6x)}{(-3x^2 - 2)^2}$$

B
$$f'(x) = \frac{(-2x^{-\frac{5}{3}})(-3x^2 - 2) + (3x^{-\frac{2}{3}} - 3)(-6x)}{(-3x^2 - 2)^2}$$

C
$$f'(x) = \frac{(-2x^{-\frac{5}{3}})(-3x^2 - 2) - (3x^{-\frac{2}{3}} - 3)(-6x)}{(-3x^2 - 2)}$$

D
$$f'(x) = \frac{(3x^{-\frac{2}{3}} - 3)(-6x) - (-2x^{-\frac{5}{3}})(-3x^2 - 2)}{(-3x^2 - 2)^2}$$

10

Find the derivative $f'(x)$ using the quotient, natural exponential, and general exponential rules.

$$\frac{d}{dx} a^x = a^x \ln a$$

$$[12pt] f(x) = \frac{3e^x}{5 \cdot 8^x}$$

A
$$f'(x) = \frac{(3e^x)(5 \cdot 8^x \ln 8) - (3e^x)(5 \cdot 8^x)}{(5 \cdot 8^x)^2}$$

B
$$f'(x) = \frac{(3e^x)(5 \cdot 8^x) - (3e^x)(5 \cdot 8^x \ln 8)}{5 \cdot 8^x}$$

C
$$f'(x) = \frac{(3e^x)(5 \cdot 8^x) + (3e^x)(5 \cdot 8^x \ln 8)}{(5 \cdot 8^x)^2}$$

D
$$f'(x) = \frac{(3e^x)(5 \cdot 8^x) - (3e^x)(5 \cdot 8^x \ln 8)}{(5 \cdot 8^x)^2}$$

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Find the derivative $f'(x)$ using the quotient, natural exponential, and trigonometric rules.

$$\frac{d}{dx} \cos(x) = -\sin(x)$$

$$[12pt] f(x) = \frac{4e^x}{3 \cos(x)}$$

A
$$f'(x) = \frac{(4e^x)(-3 \sin(x)) - (4e^x)(3 \cos(x))}{(3 \cos(x))^2}$$

B
$$f'(x) = \frac{(4e^x)(3 \cos(x)) - (4e^x)(-3 \sin(x))}{(3 \cos(x))^2}$$

C
$$f'(x) = \frac{(4e^x)(3 \cos(x)) + (4e^x)(-3 \sin(x))}{(3 \cos(x))^2}$$

D
$$f'(x) = \frac{(4e^x)(3 \cos(x)) - (4e^x)(-3 \sin(x))}{3 \cos(x)}$$

12

Find the derivative $f'(x)$ using the quotient rule.

$$f(x) = \frac{-4x^2 - 3}{5x^2}$$

A
$$f'(x) = \frac{(-8x)(5x^2) + (-4x^2 - 3)(10x)}{(5x^2)^2}$$

B
$$f'(x) = \frac{(-4x^2 - 3)(10x) - (-8x)(5x^2)}{(5x^2)^2}$$

C
$$f'(x) = \frac{(-8x)(5x^2) - (-4x^2 - 3)(10x)}{(5x^2)^2}$$

D
$$f'(x) = \frac{(-8x)(5x^2) - (-4x^2 - 3)(10x)}{(5x^2)}$$



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13

Find the derivative $f'(x)$ using the quotient rule.

$$f(x) = \frac{-5x^{-2} + 5}{2x^2 - 4}$$

A

$$f'(x) = \frac{(10x^{-3})(2x^2 - 4) - (-5x^{-2} + 5)(4x)}{(2x^2 - 4)^2}$$

B

$$f'(x) = \frac{(10x^{-3})(2x^2 - 4) + (-5x^{-2} + 5)(4x)}{(2x^2 - 4)^2}$$

C

$$f'(x) = \frac{(10x^{-3})(2x^2 - 4) - (-5x^{-2} + 5)(4x)}{(2x^2 - 4)}$$

D

$$f'(x) = \frac{(-5x^{-2} + 5)(4x) - (10x^{-3})(2x^2 - 4)}{(2x^2 - 4)^2}$$

14

Find the derivative $f'(x)$ using the quotient rule.

$$f(x) = \frac{-2x^{\frac{3}{2}} - 3}{-3x}$$

A

$$f'(x) = \frac{(-3x^{\frac{1}{2}})(-3x) + (-2x^{\frac{3}{2}} - 3)(-3)}{(-3x)^2}$$

B

$$f'(x) = \frac{(-2x^{\frac{3}{2}} - 3)(-3) - (-3x^{\frac{1}{2}})(-3x)}{(-3x)^2}$$

C

$$f'(x) = \frac{(-3x^{\frac{1}{2}})(-3x) - (-2x^{\frac{3}{2}} - 3)(-3)}{(-3x)}$$

D

$$f'(x) = \frac{(-3x^{\frac{1}{2}})(-3x) - (-2x^{\frac{3}{2}} - 3)(-3)}{(-3x)^2}$$

15

Find the derivative $f'(x)$ using the quotient rule.

$$f(x) = \frac{3\sqrt[3]{x} + 7}{-5x^2}$$

A

$$f'(x) = \frac{(x^{-\frac{2}{3}})(-5x^2) + (3x^{\frac{1}{3}} + 7)(-10x)}{(-5x^2)^2}$$

B

$$f'(x) = \frac{(x^{-\frac{2}{3}})(-5x^2) - (3x^{\frac{1}{3}} + 7)(-10x)}{(-5x^2)}$$

C

$$f'(x) = \frac{(3x^{\frac{1}{3}} + 7)(-10x) - (x^{-\frac{2}{3}})(-5x^2)}{(-5x^2)^2}$$

D

$$f'(x) = \frac{(x^{-\frac{2}{3}})(-5x^2) - (3x^{\frac{1}{3}} + 7)(-10x)}{(-5x^2)^2}$$

16

Find the derivative $f'(x)$ using the quotient rule.

$$f(x) = \frac{-3x^{-\frac{1}{2}} - 3}{5x^2}$$

A

$$f'(x) = \frac{(\frac{3}{2}x^{-\frac{3}{2}})(5x^2) - (-3x^{-\frac{1}{2}} - 3)(10x)}{(5x^2)}$$

B

$$f'(x) = \frac{(-3x^{-\frac{1}{2}} - 3)(10x) - (\frac{3}{2}x^{-\frac{3}{2}})(5x^2)}{(5x^2)^2}$$

C

$$f'(x) = \frac{(\frac{3}{2}x^{-\frac{3}{2}})(5x^2) + (-3x^{-\frac{1}{2}} - 3)(10x)}{(5x^2)^2}$$

D

$$f'(x) = \frac{(\frac{3}{2}x^{-\frac{3}{2}})(5x^2) - (-3x^{-\frac{1}{2}} - 3)(10x)}{(5x^2)^2}$$



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Find the derivative $f'(x)$ using the quotient rule.

$$f(x) = \frac{-\frac{4}{\sqrt{x}} - 5}{-5x^2 - 2}$$

A

$$f'(x) = \frac{(2x^{-\frac{3}{2}})(-5x^2 - 2) - (-4x^{-\frac{1}{2}} - 5)(-10x)}{(-5x^2 - 2)^2}$$

B

$$f'(x) = \frac{(2x^{-\frac{3}{2}})(-5x^2 - 2) + (-4x^{-\frac{1}{2}} - 5)(-10x)}{(-5x^2 - 2)^2}$$

C

$$f'(x) = \frac{(2x^{-\frac{3}{2}})(-5x^2 - 2) - (-4x^{-\frac{1}{2}} - 5)(-10x)}{(-5x^2 - 2)}$$

D

$$f'(x) = \frac{(-4x^{-\frac{1}{2}} - 5)(-10x) - (2x^{-\frac{3}{2}})(-5x^2 - 2)}{(-5x^2 - 2)^2}$$

18

Find the derivative $f'(x)$ using the quotient, natural exponential, and trigonometric rules.

$$f(x) = \frac{5e^x}{2\sin(x)}$$

A

$$f'(x) = \frac{(5e^x)(2\cos(x)) - (5e^x)(2\sin(x))}{(2\sin(x))^2}$$

B

$$f'(x) = \frac{(5e^x)(2\sin(x)) - (5e^x)(2\cos(x))}{2\sin(x)}$$

C

$$f'(x) = \frac{(5e^x)(2\sin(x)) - (5e^x)(2\cos(x))}{(2\sin(x))^2}$$

D

$$f'(x) = \frac{(5e^x)(2\sin(x)) + (5e^x)(2\cos(x))}{(2\sin(x))^2}$$

19

Find the derivative $f'(x)$ using the quotient, natural exponential, and general exponential rules.

$$f(x) = \frac{e^x}{6^x}$$

A

$$f'(x) = \frac{(e^x)(6^x) - (e^x)(6^x \ln 6)}{(6^x)^2}$$

B

$$f'(x) = \frac{(e^x)(6^x) + (e^x)(6^x \ln 6)}{(6^x)^2}$$

C

$$f'(x) = \frac{(e^x)(6^x \ln 6) - (e^x)(6^x)}{(6^x)^2}$$

D

$$f'(x) = \frac{(e^x)(6^x) - (e^x)(6^x \ln 6)}{6^x}$$